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**TESTIMONY OF NORMAN R. AUGUSTINE
BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES OF THE UNITED STATES
SENATE**

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WASHINGTON, DC**

Good morning, Chairwoman Murkowski, Ranking Member Cantwell, and Members of the Committee. Thank you for inviting me to speak with you today on how we can strengthen our federal investments in energy technology innovation.

I am a member of the board of directors of the Bipartisan Policy Council and co-chair of the American Energy Innovation Council, or AEIC. My associates in the AEIC are John Doerr, partner at Kleiner Perkins Caufield & Byers; Bill Gates, founder of Microsoft; Charles Holliday, retired CEO of DuPont; Jeff Immelt, chairman and CEO of GE; and Michael Graff, President and CEO of Air Liquide USA. We have all led major innovation-based enterprises and understand the critical importance of investments in new technologies. Our objective is to seek greater federal support for energy technology innovation investments because of their important potential impact upon our nation, including its economic future and international competitiveness; preservation of the national environment; and assuring national security. I am an engineer and businessperson, not a researcher, and the views I express will be my own.

In my remarks today I would like to indicate why I consider energy innovation to be of such importance; very briefly address several of the bills under your consideration; speak to the role of the National Laboratories; and conclude with an assessment of where America stands in the global, increasingly competitive race for energy technology leadership.

But first let me offer a few words about why I focus on energy technology innovation. Private-sector innovation on its own cannot restore American energy technology leadership. Private companies cannot capture the full economy-wide value of new knowledge and thus systematically underinvest in research and development relative to the benefits it produces. Moreover, the longer-term the research and development investment, the less likely private companies will choose to underwrite it when compared with the opportunities presented by shorter-term, incremental investments as demanded by the public equity markets. This is precisely why there is a critical role for the federal government in energy technology research and development. Public investment has been critical to generating the discoveries and inventions that form the basis of previous disruptive energy sources--be that commercial nuclear power, jet engines, shale gas, or solar photovoltaic technology. Markets will undoubtedly drive innovation, but U.S. businesses will only win the global, increasingly competitive race for energy technology leadership when supported by public innovation investments.

Despite its importance to our economy and future, federal energy innovation investments have stagnated over the last five years, remaining at or below 2010 levels in real dollars. The extent of America's disinvestment in research is such that America now ranks 29th among developed nations in the fraction of research that is governmentally funded. It is projected that within about five years China will surpass the U.S. in research funding as both a fraction of GDP and in absolute terms. This does not portend well for national security, jobs, the economy or the well-being of America's citizens.

Simply stated, America must compete. And if it is going to compete, it needs to invest in ingenuity.

I commend you both, Chairwoman Murkowski and Ranking Member Cantwell, as well as your colleagues Senator Gardner and Senator Heinrich, for co-sponsoring S. 1398, the Energy Title of the America COMPETES Reauthorization Act. This bill would begin to put federal energy innovation investments back on the growth track that bipartisan Congressional majorities initiated in the 2007 America COMPETES Act and sustained in its 2010 reauthorization. In my view, this piece of legislation is of pivotal importance with regard to America's competitiveness future.

Furthermore, I strongly support the efforts of this committee to proactively identify and support priority areas for federal research investment. Your colleagues in the House previously invited me to testify on the significance of research in high-performance computing, and I am pleased to see your committee take up companion legislation in S. 454. Additionally, I want to acknowledge the several bills that seek to increase research and development efforts associated with energy storage. Few other technologies could be as much of a game-changer for the U.S. energy system and international technology leadership.

But in addition to increasing energy technology investments, the federal government must seek to maximize the returns on those investments.

Most federal energy innovation investments are channeled through the 17 National Laboratories, which fill a role otherwise largely neglected by industry: namely, long-term, high-risk/high-payoff, often large-scale projects whose applications may not be evident at their outset. Having observed the Labs closely in my roles as Undersecretary of the Army, CEO of Lockheed Martin Corporation, and a frequent chair of National Academies and other studies, I understand that the large body of research conducted in the National Labs not only has advanced specific energy technologies, like nuclear power and hydraulic fracturing, but also tends to find applications in industry in non-energy fields. Unfortunately, in my view relatively little of this potential is being realized by American industry as it seeks to compete in the global marketplace. Among the many reasons for this, one is that industry, especially small firms, has little idea what research is being conducted at the national laboratories. A second reason is that well-intended rules and oversight mechanisms make it difficult for the laboratories to work closely with industry and also discourage the best means of technology transfer, the movement of people between government and industry. Other nations seem to have found solutions to these problems, albeit not without accepting certain risks. It is my view that the national laboratories are generally well run and are a national treasure that could make an even greater contribution than is the case today. But to do this they will need to be given greater latitude to create and additional funding—especially ARPA-E.

The Committee today is considering a number of bills that address different aspects of this challenge. What unites them all is a strong, bipartisan agreement on the importance of public-private partnerships in energy technology innovation, primarily through the National

Laboratories. Facilitating these partnerships among universities, industry, and the Labs will more readily translate publicly funded research into commercial offerings, maximizing the return on federal investments. I have previously endorsed bipartisan companion legislation in the House to S. 1187 the America INNOVATES Act, which seeks to ease the establishment of public-private technology partnerships, and I encourage the committee to consider including its provisions in future legislation. I also want to acknowledge the efforts in S. 784 and S. 1259, which in particular address the issue for smaller companies that may lack the resources to engage with the Labs.

Fundamentally, these federal investments in energy research must be guided by long-term vision. My colleagues and I support a national planning process, such as is recommended in the S. 1033 the Quadrennial Energy Review Act. I also want to acknowledge Chairwoman Murkowski's bill S. 1229, which would direct DOE to develop an implementation plan for recommendations given by the Commission to Review the Effectiveness of the National Energy Laboratories. As a sitting member of that committee, I appreciate your support in advance of our final conclusions--it not only is a vote of confidence for our work, but also for underscoring the urgency of reforms to ensure federal investments best support America's competitiveness.

I will conclude my remarks by addressing the question that often seems to be on people's minds when they observe my commitment to strengthening research in America. Why, they ask, would a fellow creeping up on 80-years of age, a non-researcher, view this as such a critical issue. The reason is that everything I have observed in my various roles in industry, government and academia suggests that other than our freedom and Free Enterprise system, discovery, invention and education are the nation's most fundamental assets and as such are the keys to a prosperous and secure future for America's citizens.

Thank you.